

An Overview on Aminoglycosides and its Mechanism

Navya Ghosh*

Department of Pharmacy, Guru Ghasidas Vishwavidyalaya, Bilaspur, Chhattisgarh, India

DESCRIPTION

Aminoglycosides are a group of antibiotics that are commonly used in the treatment of serious bacterial infections. These antibiotics are effective against a wide range of gram-negative bacteria, including *Pseudomonas aeruginosa*, *Klebsiella pneumoniae* and *Escherichia coli*, as well as some gram-positive bacteria, such as *Staphylococcus aureus*. These are used as options to treat multidrug resistant pathogens. Nephrotoxicity can be treated by using these agents.

Mechanism of action

Aminoglycosides work by binding to the bacterial ribosome, specifically to the 30S subunit, which is responsible for protein synthesis. This binding disrupts the formation of the initiation complex, leading to the inhibition of protein synthesis. In addition, aminoglycosides can also cause misreading of the genetic code, which can lead to the incorporation of incorrect amino acids into the growing peptide chain. This, in turn, can lead to the production of non-functional proteins, which can ultimately lead to bacterial death.

Types of aminoglycosides

There are several different types of aminoglycosides that are commonly used in clinical practice, including gentamicin, tobramycin, amikacin, neomycin, and streptomycin. Each of these antibiotics has a slightly different spectrum of activity and a different side-effect profile.

Gentamicin: Gentamicin is one of the most commonly used aminoglycosides. It is effective against a wide range of gram-negative bacteria, including *Pseudomonas aeruginosa* and *Escherichia coli*. It is often used in combination with other antibiotics, such as a beta-lactam antibiotic, for the treatment of serious bacterial infections, such as pneumonia and sepsis.

Tobramycin: Tobramycin is another commonly used aminoglycoside. It is similar in structure and activity to gentamicin and is often used interchangeably with gentamicin.

Tobramycin is particularly effective against *Pseudomonas aeruginosa* and is commonly used in the treatment of respiratory tract infections in patients with cystic fibrosis.

Amikacin: Amikacin is a newer aminoglycoside that is similar in structure and activity to gentamicin and tobramycin. It is often used in situations where these antibiotics are not effective or where there is concern about antibiotic resistance. Amikacin is particularly effective against gram-negative bacteria that are resistant to other antibiotics.

Neomycin: Neomycin is an aminoglycoside that is primarily used topically, as it is poorly absorbed when taken orally. It is commonly used in the treatment of skin and eye infections, as well as in the preparation of the bowel prior to surgery.

Streptomycin: Streptomycin was the first aminoglycoside to be discovered and is still used today, primarily in the treatment of tuberculosis. It is effective against *Mycobacterium tuberculosis*, the bacteria that causes tuberculosis, and is often used in combination with other antibiotics for the treatment of this disease.

Side effects

Aminoglycosides are associated with a number of side-effects, which can limit their use. The most common side-effects include nephrotoxicity (damage to the kidneys) and ototoxicity (damage to the inner ear), which can lead to hearing loss and balance problems. Other side-effects include neuromuscular blockade, which can lead to muscle weakness and respiratory failure, and hypersensitivity reactions, which can cause rash, fever, and difficulty breathing.

Due to their potential for toxicity, aminoglycosides are often used in a carefully monitored setting, such as a hospital, and are typically administered intravenously. In addition, the dosing of aminoglycosides is typically based on the patient.

*Correspondence to: Navya Ghosh, Department of Pharmacy, Guru Ghasidas Vishwavidyalaya, Bilaspur, Chhattisgarh, India, E-mail: navyaghosh99@gmail.com

Received: 04-Oct-2022, Manuscript No. JGB-22-23549; Editor assigned: 07-Oct-2022, Pre QC No. JGB-22-23549 (PQ); Reviewed: 21-Oct-2022, QC No. JGB-22-23549; Revised: 28-Oct-2022, Manuscript No. JGB-22-23549 (R); Published: 04-Nov-2022, DOI: 10.35841/2168-958X.22.11.207

Citation: Ghosh N (2022) An Overview on Aminoglycosides and its Mechanism. J Glycobiol. 11:207.

Copyright: © 2022 Ghosh N. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.